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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/370,508	08/06/1999	UMESH SHARMA	20944.9000	8186
25700	7590	01/02/2004		
FARJAMI & FARJAMI LLP 16148 SAND CANYON IRVINE, CA 92618				
EXAMINER DEO, DUY VU NGUYEN				
ART UNIT		PAPER NUMBER		
1765				

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/370,508

Applicant(s)

SHARMA ET AL.

Examiner

DuyVu n Deo

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 14-18, 20-24, 26, 28-31 and 33-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-36 is/are allowed.
- 6) ☒ Claim(s) 1, 6-10, 14-18, 20-24, 26 and 28-31 is/are rejected.
- 7) ☒ Claim(s) 2-5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10, 14, 26, 28, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu et al. (US 6,245,682), Lou et al. (US 5,597,754), and Wolf et al. (Silicon Processing for the VLSI Era, Vol.1).

Referring to claims 10, 14, Fu teaches a method of forming a semiconductor device comprising: depositing a layer of polysilicon (claimed polycrystalline silicon) on a substrate (4, line 32); depositing an oxide layer over the polysilicon (col. 4, line 33); depositing an oxynitride layer of about 30 nm (300 angstrom) over the oxide layer (col. 4, line 33, 55, 56); depositing a resist pattern over the oxynitride (col. 4, line 63); patterning the oxynitride layer, the oxide layer, and the polysilicon layer to form a stack (col. 5, line 1-5); removing the remaining oxynitride in the stack by using phosphoric acid (col. 5, line 23-25). Unlike claimed invention, Fu doesn't describe removing the oxynitride without subjecting the oxynitride to any temperature greater than about 400 degrees Celsius after the step of depositing the layer of silicon oxynitride. Since Fu teaches that there are only steps of processing the resist and forming a thermal oxide layer between depositing and removing the oxynitride layer and it is conventional that the processing

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of photoresist is done with T that is under 400 degrees Celsius, as evidently supported by Wolf (pg 429-455, pg 518), and the thermal oxidation of the polysilicon is done under 400 degrees Celsius, as evidently supported by Lou (col. 4, line 16-20), it would have been obvious to one skill in the art in light of Wolf's teaching of processing the photoresist, and Lou's teaching of thermal oxidation of the polysilicon, because Wolf and Lou further describe the processing parameters that are known to one skill in the art at the time of the invention to form the resist pattern and the thermal oxide layer. The combined method would inherently not having any step that would subject the silicon oxynitride to any temperature greater than about 400 degree Celsius between the depositing and removing the oxynitride layer.

Referring to claim 31, Fu teaches etching the oxynitride using hot phosphoric acid (100-150 degree Celsius) (col. 5, line 23-31).

3. Claims 1, 6, 18, 23, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu/Lou/Wolf and further in view of Lee (US 5,620,913).

Unlike claimed invention, applied prior art above doesn't describe forming an interpoly nitride dielectric and a second poly layer. Lee describes a method for forming a flash memory comprising the steps of forming an interpoly dielectric, including a nitride layer, and a second poly layer; and patterning the stack to form a gate electrode (col. 5, line 55-col. 6, line 10). It would have been obvious for one skill in the art to modify Fu's method in light of Lee's teaching because Fu teaches a method for forming a poly gate structure (summery) and one example of a gate structure is taught by Lee, having an interpoly dielectric, including a nitride layer and a second poly layer in order to form a flash memory cell with a reasonable expectation of success.

Referring to claim 1, the combined method would include etching the antireflective oxynitride, polysilicon, and the interpoly nitride to form a gate electrode.

4. Claims 7-9, 15-17, 20-22, 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu/Lou/Wolf/Lee as applied to claims 1, 14, 20, 28 above, and further in view of Cheung et al. (US 5,968,324).

Referring to the reactants and processing for forming oxynitride, Cheung teaches a method of forming oxynitride using  $\text{SiH}_4$  and  $\text{N}_2\text{O}$  wherein the ratio between them is about 1.0 and Cheung further teaches that the refractive index, absorptive index, and thickness for different wavelengths can be controlled by varying the parameters and the rate at which the gases are introduced (col. 3, line 1-5; col. 4, line 1-33). It would have been obvious at the time of the invention for one skill in the art to deposit the oxynitride in light of Cheung because Cheung further teaches controlling the parameters for the deposition of the oxynitride that is used by above Fu in order to control the refractive index, the absorptive index, and the thickness of the oxynitride.

5. Wolf is cited to show that RIE of insulator (such as silicon oxide) is known and available to one skill in the art (pages 539-542).

#### *Response to Arguments*

6. Applicant's arguments with respect to claims 1-10, 14-18, 20-24, 26, 28-31 have been considered but are moot in view of the new ground(s) of rejection.

*Allowable Subject Matter*

7. Claims 2-5 remained allowable.
8. Claims 33-36 are allowed for the same reason of allowing claims 2-5 cited in the previous action.

*Conclusion*

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD  
December 22, 2003

ROBERT KUNEMUND  
PRIMARY EXAMINER